

## CLAIMS

What is claimed is:

1. An evaporator comprising:  
two first plates, each having a first configuration, engaged in a back to back mirrored relationship to one another to form a first pair;  
two second plates, each having a second configuration, engaged in a back to back mirrored relationship to one another to form a second pair, said first pair and said second pair stacked together.
2. The evaporator of claim 1 wherein each of said two first plates includes a first peripheral lip extending along the periphery of said first plate and a first center portion recessed with respect to said peripheral lip, said peripheral lips of said two first plates engage one another, whereby said center portions are spaced apart from one another defining a first cavity therebetween.
3. The evaporator of claim 2 wherein each of said two first plates includes a first return aperture adjacent said first center portion communicating with said first cavity.
4. The evaporator of claim 3 wherein the each of said two first plates includes a first inlet aperture and a first outlet aperture disposed on an opposite side of said first center portion relative to said first return aperture.
5. The evaporator of claim 4 wherein the each of said two first plates includes at least one mound projecting from said first center portion and surrounding one of said first inlet aperture and said first outlet aperture, said mounds of said two first plates of said first pair engage one another, whereby said one aperture surrounded by said mound is isolated from said first cavity.
6. The evaporator of claim 4 wherein each of said two second plates includes a second peripheral lip extending along the periphery of said second

plate and a second center portion recessed with respect to said second peripheral lip, said peripheral lips of said two second plates engaged with one another, whereby said second central portions are spaced apart from one another defining a second cavity therebetween, each of said two second plates also including a second return aperture adjacent said second center portion, said second return apertures communicating with said second cavity, each of said two second plates also including a second inlet aperture and a second outlet aperture disposed on an opposite side of said second center portion relative to said second return aperture.

7. The evaporator of claim 6 wherein:

each of said two first plates includes a first return trough recessed with respect to said first center portion, said first return aperture disposed at a bottom of said first return trough; and

each of said two second plates includes a second return trough recessed with respect to said second center portion, said second return aperture disposed at a bottom of said second return trough, said bottom of said first return trough engaging said bottom of said second return trough between adjacent pairs of plates, whereby said return apertures of the plates are aligned to define a return tank in communication with the first and second cavities.

8. The evaporator of claim 7 wherein:

each of said two first plates includes a first mound projecting from said first center portion and surrounding said first outlet aperture, said first mounds of said two first plates engaged with one another, whereby said first outlet aperture is isolated from said first cavity; and

each of said two second plates includes a second mound projecting from said second center portion and surrounding said second inlet aperture, said second mounds of said two second plates engaged with one another, whereby said second inlet aperture is isolated from said second cavity.

9. The evaporator of claim 8 wherein:

each of said two first plates includes a first inlet trough recessed with respect to said first center portion, said first inlet aperture disposed at a bottom of said first inlet trough; and

each of said two second plates includes a second inlet trough recessed with respect to said second center portion, said second inlet aperture disposed at a bottom of said second inlet trough, said bottom of said first inlet trough engaging said bottom of said second inlet trough between adjacent pairs of plates, whereby said inlet apertures of the plates are aligned to define an inlet manifold in communication with only the first cavity relative to the first and second cavities.

10. The evaporator of claim 8 wherein:

each of said two first plates includes a first outlet trough recessed with respect to said first center portion, said first outlet aperture disposed at a bottom of said first outlet trough; and

each of said two second plates includes a second outlet trough recessed with respect to said second center portion, said second outlet aperture disposed at a bottom of said second outlet trough, said bottom of said first outlet trough engaging said bottom of said second outlet trough between adjacent pairs of plates, whereby said outlet apertures of the plates are aligned to define a outlet manifold in communication with only the second cavity relative to the first and second cavities.

11. The evaporator of claim 10 including:

a third pair formed with said two first plates engaged in a back to back mirrored relationship to one another, said third pair stacked with said first and second pairs such that said second pair is disposed between said first and third pairs.

12. A method for manufacturing an evaporator comprising the steps of:

engaging two first plates, each having a first configuration, in a back to back mirrored relationship to one another to form a first pair;

engaging two second plates, each having a second configuration, in a back to back mirrored relationship to one another to form a second pair; and  
stacking said first pair and said second pair.

13. The method of claim 12 including:

engaging another two said first plates in a back to back mirrored relationship to one another to form a third pair; and

stacking said third pair and said second pair whereby said second pair is disposed between said first and third pairs.

14. The method of claim 13 including:  
directing a first fluid stream in a first direction between said two first plates of said first pair;  
directing a second fluid stream in a second direction between said two second plates of said second pair, wherein said first direction is opposite of said second direction; and  
directing a third fluid stream in said first direction between said two plates of said third pair.

15. The method of claim 12 including:  
forming said first plate with a first peripheral lip extending along the periphery of said first plate, a first center portion recessed with respect to said first peripheral lip and having first and second ends, a first return trough recessed with respect to said center portion and having a first return aperture disposed in said first return trough, a first inlet trough adjacent said second end and recessed with respect to said first center portion with a first inlet aperture disposed in said first inlet trough, a first outlet trough adjacent said first inlet trough and recessed with respect to said first center portion with a first outlet aperture disposed in said first outlet trough, and a first mound projecting from said first center portion and surrounding said first outlet trough.

16. The method of claim 15 wherein said step of engaging two first plates is further defined as engaging said first peripheral lips of said two first plates with one another and said first mounds thereof with one another, whereby said first return apertures, said first inlet apertures and said first outlet apertures thereof are aligned.

17. The method of claim 16 including:  
forming said second plate wherein said second plate includes a second peripheral lip extending along the periphery of said second plate, a

second center portion recessed with respect to said second peripheral lip and having first and second ends, a second return trough recessed with respect to said second center portion and having a second return aperture disposed in said second return trough, a second inlet trough adjacent said second end and recessed with respect to said second center portion with a second inlet aperture disposed in said second inlet trough, a second outlet trough adjacent said second inlet trough and recessed with respect to said second center portion with a second outlet aperture disposed in said second outlet trough, and a second mound projecting from said second center portion and surrounding said second inlet trough.

18. The method of claim 17 wherein said step of engaging two second plates is further defined as engaging said second peripheral lips of said two second plates with one another and said second mounds thereof with one another, whereby said second return apertures, said second inlet apertures and said outlet second apertures thereof are aligned.

19. The method of claim 18 wherein said step of stacking said first pair and said second pair is further defined as:

engaging a bottom of said first return trough of one of said first plates with a bottom of said second return trough of an adjacent second plate;

engaging a bottom of said first inlet trough of said first plate with a bottom of said second inlet trough of said adjacent second plate; and

engaging a bottom of said first outlet trough of said first plate with a bottom of said second outlet trough of said adjacent second plate.

20. An evaporator comprising:

a first plate including a first peripheral lip extending along the periphery of said first plate, a first center portion recessed with respect to said lip and having first and second ends, and a width, a first return trough recessed with respect to said center portion and having a first return aperture positioned

at a bottom of said first return trough, first and second inlet troughs adjacent said second end and recessed with respect to said center portion with inlet apertures disposed in each inlet trough, a first outlet trough disposed between said first and second inlet troughs and recessed with respect to said center portion with an outlet aperture disposed in said outlet trough, and a first mound projecting from said center portion and surrounding said outlet trough;

a second plate including a second peripheral lip extending along the periphery of said second plate, a second center portion recessed with respect to said second lip and having third and fourth ends, and a second width, a second return trough recessed with respect to said second center portion and having a second return aperture positioned at a bottom of said second return trough, third and fourth inlet troughs adjacent said fourth end and recessed with respect to said second center portion with inlet apertures disposed in each inlet trough, a second outlet trough disposed between said third and fourth inlet troughs and recessed with respect to said second center portion with a second outlet aperture disposed in said second outlet trough, a second mound projecting from said second center portion and surrounding said third inlet trough, and a third mound projecting from said second center portion and surrounding said fourth inlet trough;

a pair of first plates disposed in a back to back mirrored relationship to one another with said peripheral lips thereof engaging one another and said first mounds thereof engaging one another, whereby said return apertures, said inlet apertures and said outlet apertures thereof are aligned;

a pair of second plates disposed in a back to back mirrored relationship to one another with said peripheral lips thereof engaging one another and said second and third mounds thereof engaging one another, whereby said return apertures, said inlet apertures and said outlet apertures thereof are aligned; and

said pairs being alternately stacked with respect to one another with said first and second return troughs engaging one another whereby said return apertures are aligned to define a return tank, said inlet troughs engaging

one another whereby said inlet apertures are aligned to define a first and second inlet manifolds, and said outlet troughs engaging one another whereby said outlet apertures are aligned to define an outlet manifold, and whereby said center portions of said pair of first plates are spaced apart to define a fluid pathway communicating with the return tank and the first and second inlet manifolds and said center portions of said pair of second plates are spaced apart to define a fluid pathway communicating with the return tank and the outlet manifold.